

Digital-Photo Adapter DC01



INSTRUCTION MANUAL

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Introduction

The **Digital-Photo Adapter DC01** is an accessory to the Slit Lamp BQ 900® and allows digital monophotography of the human eye. The **Digital-Photo Adapter DC01** works with the following Nikon Coolpix® cameras: 950 and 990.

Please read the instruction manual and the current appendices carefully before operating the device for the first time.

The instruction manuals of the Slit Lamp BQ 900® and the Coolpix® camera should also be studied.

Only properly trained and authorized persons are to operate the **Digital-Photo Adapter DC01**.

We will be forced to disclaim any warranty and liability if the instrument is altered in any way or if routine maintenance is neglected or not carried out according to factory specifications.

Only Original **Haag-Streit** spare parts are to be used to ensure continued reliability of the instrument.

2. Operating safety

2.1 Mandatory safety precautions

- ☐ The Digital-Photo Adapter DC01 has been designed and constructed to conform with **93/42/EEC** standards. Manufacturing procedures, testing, commissioning, maintenance and repair are conducted under the observance of Swiss and International regulations.
- ☐ As long as the Digital-Photo Adapter DC01 remains in its original packaging, it may be exposed to the following environmental conditions without getting damaged for a maximum period of 15 weeks during shipping and storage:
Ambient temperatures from -10 degrees C to +60 degrees C; air pressure within a range of 500 HPA to 1060 HPA; relative humidity within a range from 10 % to 90 %. The Equipment should remain in the original packaging for several hours to adjust to the new ambient temperature (to prevent the formation of condensation).
- ☐ All statutory accident prevention regulations are to be observed.

2.2 Notes on use

The following details should be observed to ensure safe operation of the equipment.

- ☐ The Digital-Photo Adapter DC01 should only be cleaned with a water dampened cloth - no corrosive agents are to be employed.
- ☐ Only the exterior surfaces of the equipment are to be cleaned in accordance with the notes in the instruction manual.
- ☐ Repairs and alterations on this equipment should only be carried out by our factory trained service technicians or by other authorized persons. The manufacturer will disclaim all liability for loss or damage resulting from any unauthorized repair attempts and the warranty will be rendered null and void.

- ☐ The equipment may only be operated with the listed accessories in accordance with the instruction manual or with the separate instruction manual specific to such accessories.
- ☐ The safety aspects and information emphasized in the instruction manual are to be observed with special care.
- ☐ Only qualified and trained personnel should be permitted to operate the equipment.
- ☐ The training of the operating personnel is the responsibility of the owner of the equipment.
- ☐ The serial number of the Digital-Photo Adapter DC01 can be found on the identification plate.

2.3 Notes on maintenance

- ☐ The connecting pieces of the equipment that serve to ensure safe operation are to have a proper fit. The screw connections for all accessories are to be firmly tightened.

2.4 Warning notices



• **CAUTION** •
Strictly observe all warning notices!

3. Description of the equipment

The photographs can either be taken using the integrated slit lamp illumination or the optional cold light source and adapter piece. The optional diffuser filter is also a recommended accessory for field illumination.

The beam path for the photograph is identical to the beam path of the observer facility in the BQ microscope. The route of the beam path leading to the camera is via the beam splitter 900.7.10.

Photographs of various magnifications can be taken dependent on the setting of the magnification changer and the integrated zoom of the digital camera.

The Digital-Photo Adapter DC01 consists of the following components:

- Digital-Photo Adapter
- Cable guide
- Fixation bands (Velcro®)



Fig. 2: Digital-Photo Adapter

- fixation band (Velcro®)
- cable guide
- cable tidy
- quick release key

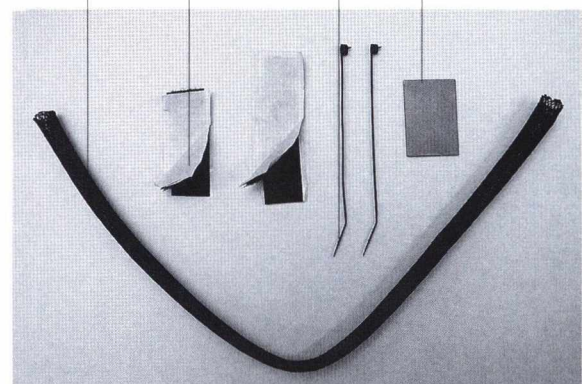


Fig. 3: Cable guide, fixation bands (Velcro®), cable tidies and quick release key

Note the beam splitter and eye-piece with crosshair reticule can be purchased separately and are optionally delivered with the Digital-Photo Adapter.



Fig. 4: Beam splitter
necessary accessory

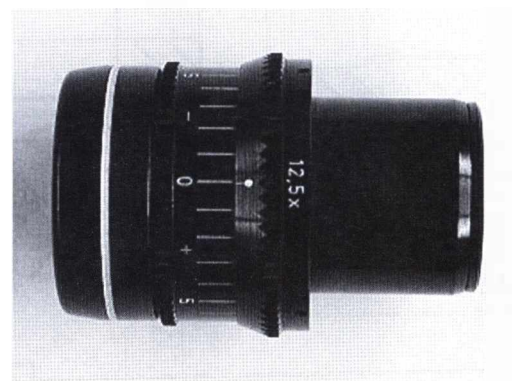


Fig. 5: Eye-piece with crosshair reticule
recommended accessory

Recommendations:

For a good illumination of the frontal part of the eye, it is strongly recommended to use the BQ microscope equipped with the optional cold light source and adapter piece (1).

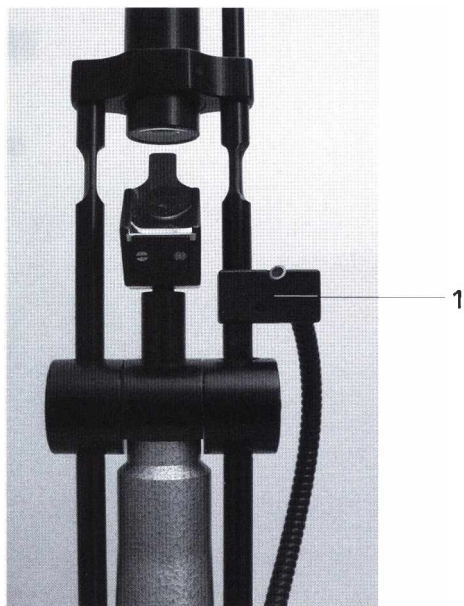


Fig. 6: Slit lamp equipped with a cold light source

The optional diffusor filter (2) can be used as alternative to the cold light source, but it does not allow a slit image.

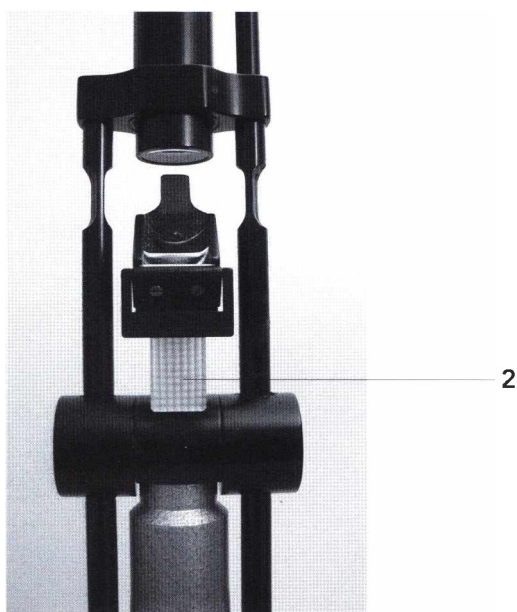


Fig. 7: Slit lamp equipped with a diffusor (off-position)

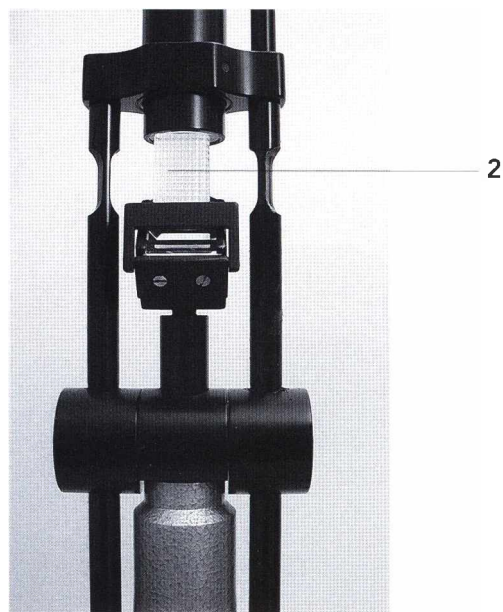


Fig. 8: Slit lamp equipped with a diffusor (on-position)

For a perfect match of the images observed through the biomicroscope and the camera, the use of the eye-piece with crosshair reticule 900.7.4 C is recommended. This eye-piece is not required if the camera is used in auto-focus mode or if the observation is done on an optional video monitor (see Chapter 4).

The Digital-Photo Adapter has been successfully tested with the following **Coolpix®** cameras:

- Coolpix® 990
- Coolpix® 950

The Coolpix® 990 is seen as the best suited camera for operation with the BQ biomicroscope.

The following Coolpix® accessories are recommended:

- A/C adapter Nikon Part # EH-31
- Remote release cable Nikon Part # MC-EU1 (Coolpix® 990)
- PC-card adapter Nikon Part # EC-AD1
- An high capacity Compact Flash™ memory card (64 MB or higher recommended)

An optional video monitor can be directly connected to the Coolpix® camera. The monitor can be used for live observation or to display the images already recorded by the camera.

The software EyeCap SL represents the ideal solution for image and patient management. EyeCap SL provides the ability to rapidly compare patient's images over time.

Please consult with your HS Distributor for further information.

4. Operating the equipment

• **NOTICE** •

It is imperative that the instruction manual of the Slit Lamp BQ 900® is observed!



• **CAUTION** •

It is imperative to read the chapter "Operating safety" before operating the equipment and to observe its precautions.

• **NOTICE** •

The beam splitter is to be switched on when of taking the photograph (button withdraw).

• **NOTICE** •

It is imperative that the instruction manual of the Coolpix® camera is observed!

• **NOTICE** •

The object image section viewable through the lens cannot be entirely photographed. The precise sizes of the object image sections photographed can be obtained from the technical specifications.

4.1. Setting of the Coolpix® camera

Consult the *Nikon's guide to digital photography* delivered with the Coolpix® to know how to change the different settings of the camera.

The relevant camera settings are:

• **Zoom position**

The Digital-Photo Adapter has been optimized for the following settings:

- optical zoom in the maximum position
- no digital zoom (digital zoom in the position X1.0)

With these settings, the magnification of the images observed through the camera and the the eye-pieces is the same.

The selection of other optical zoom positions will produce a different field of view in the camera and in the eye-pieces. Moreover the image will appear darker at the borders (vignetting) and the exposure times will be increased resulting in lower quality images.

The use of the digital zoom (X1.0 to X4.0) will produce a degradation of the image quality.

• **Focus option**

The camera can either be used with the focus fixed at infinity, or in autofocus mode (see chapter 4).

• **Flash**

The integrated flash cannot be used. The flash needs to be disabled when the camera is used in autofocus mode.

4.2. Adjustment of the depth of focus

The Digital-Photo Adapter is equipped with a progressively adjustable diaphragm (index ring 4 = smallest, 1 = largest). The depth of focus is increased by closing the diaphragm. However, a closed diaphragm produces darker and vignetted images resulting in longer exposure times. In most cases, it is suggested to work with the diaphragm in the open position (index ring 1).

4.3. Operating modes

We distinguish two different operation modes which are described hereafter.

A. Autofocus mode

Camera settings: autofocus
flash disabled

In this mode, the camera adjusts focus automatically. This provides an enhanced flexibility as the microscope does not need to be perfectly in focus. This is particularly practical if you directly observe the examination on a monitor. You can then change the image magnification by moving the microscope back and forth, the camera adjusting the focus automatically.

However the autofocus mode is not well adapted for the observation of curved images. In this case the camera will focus on the point closest to the camera (see Nikon documentation), which is not necessarily the point of interest. The depth of focus can be improved to some extent by closing the diaphragm of the Digital-Photo Adapter.

B. Infinity focus mode

Camera settings: focus fixed at infinity (the flash is automatically disabled)

In this mode, the camera mimics the microscope (same focus, same magnification). The focus of the image seen in the camera corresponds to the focus of the image seen in the **left** ocular. Note however that this is only the case if the left ocular is perfectly adjusted to the eye of the observer.

The adjustment of the ocular is made easier by using the optional eye-piece with crosshair reticule (part number 900.7.4 C). This ocular is perfectly adjusted when the double crosshair reticule is in focus.

4.4. Observation, image capture and data transfer

For the observation of the cornea and anterior chamber, it is recommended to use the optional cold light source provide to a good field illumination.

The beam path of the left ocular, with which the camera is connected, should not be encroached upon by interfering shadow effects (slit lamp illuminator).

The observation can be done in two modes:

- through the microscope

It has the advantage of better optical quality and to give a stereoscopic view. It should be noted however, that the photographs correspond to the view as seen through the left ocular only.

- on an optional TV monitor directly connected to the camera

If the camera is set in autofocus, this mode of observation allows a greater flexibility. The magnification can continuously be changed by moving the microscope back and forth.

However, the quality of the observation is limited by the reduced TV resolution. The recorded photographs can be played back directly on the TV monitor.

For long-term storage or editing, the photographs can be transferred to a computer. The camera can be connected directly to the computer via the USB cable or the optional serial cable. Note that no shots can be made while the camera is connected to the computer (see Nikon's instruction manual). Another option consists of reading the camera memory card directly onto the computer by using a CF card reader or a PC-card adapter.

The images can be viewed on the computer by using any picture viewer program. For patient administration, the photographs can also be imported into an advanced program such as EyeCap SL.

Please consult with your HS Distributor for further information.

Appendix A. Installation of the equipment

• NOTICE •

It is imperative that the instruction manual of the Slit Lamp BQ 900® is observed!

A.1. Installation of the adapter and the camera

First installation:

1. Firmly tighten all locking knobs on the slit lamp.
2. If not already done, mount the beam splitter onto the microscope.
3. The Digital-Photo Adapter is to be installed on the left of the microscope (independently of which eye is being photographed). Remove the cover mounted on the left side of the beam splitter.
4. Remove the protection cover (1) from the small arm of the Digital-Photo Adapter (2). Unscrew the adaptation ring (3) from the adapter. Screw firmly the adaptation ring (3) on the Coolpix® (4) camera with the quick release key (5).



Fig. 10: Digital-Photo Adapter

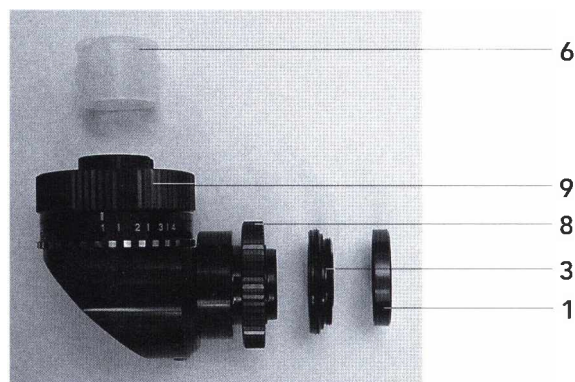


Fig. 11: Adaptation rings

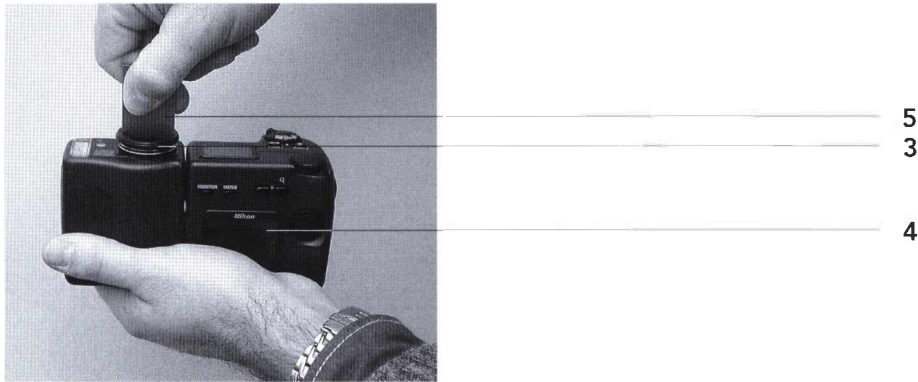


Fig. 12: Attachment of the adaptation ring to the camera using the quick release key

5. Press slightly the adapter against the camera. Turn the adapter and the camera against each other until they perfectly fit. Turn the small ring (8) in order to fix the adapter and the camera.
6. Remove the cover mounted on the big arm of the adapter (6). The adapter has to be mounted in such a way that the camera is below and parallel to the microscope (see cover). If the camera cannot be mounted due to its inappropriate orientation, realign it following the instructions given at point 7.

Present the adapter against the left arm of the beam splitter. Fix the adapter by screwing the big ring (9).

7. Due to the mechanical tolerances, the camera is generally not perfectly aligned the first time it is mounted. A misaligned camera will produced turned images. To align the camera, hold firmly with the left hand. Slightly unscrew the alignment screw (7) (one half turn is enough).

For a rough alignment orientate the camera parallel to the microscope as shown in *Fig. 13*. For a fine alignment, repeat the operation with the camera turned on. Rotate the camera until the images observed through the camera and the eye-pieces have the same orientation. Firmly tighten the alignment screw (7).

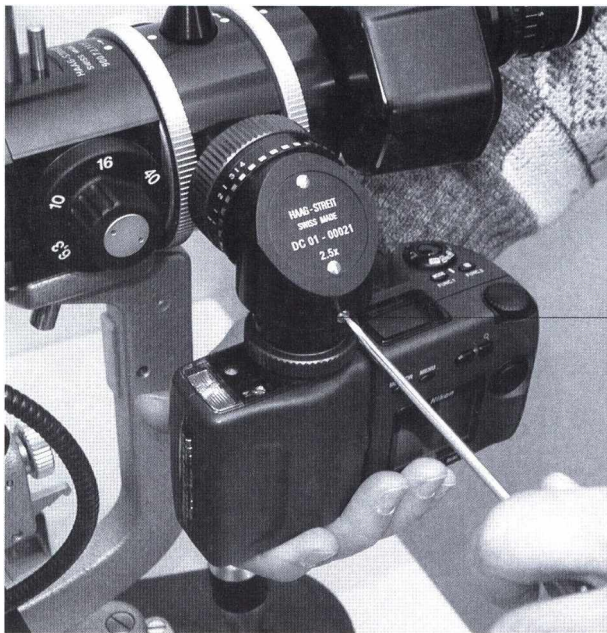


Fig. 13: Alignment screw

Removal and remounting of the camera

The camera can be rapidly removed and remounted without detaching the adapter from the microscope.

1. To remove the camera, hold firmly with the left hand and unscrew the small ring (8).
2. To remount the camera, hold firmly with the left hand, present it front of the adapter, turn the camera until it fits to the adapter, and tighten the small ring (8).

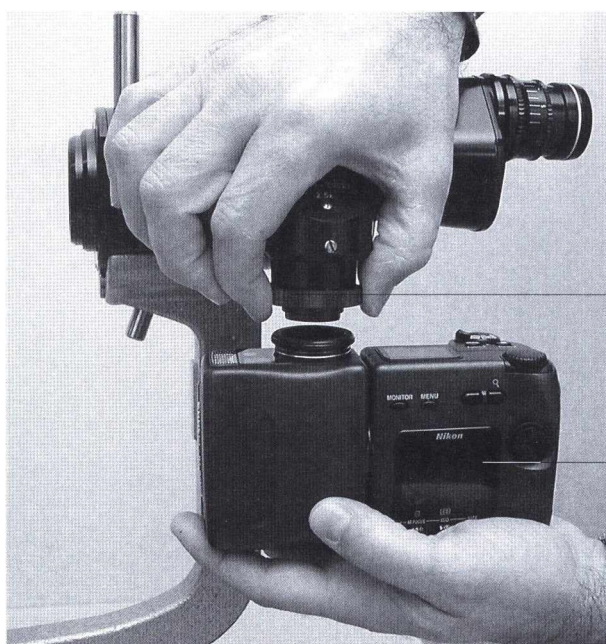


Fig. 14: Removal and remounting of the camera

A.2. Handling of the cables

The camera can be operated in many different ways. Depending on the selected configuration, different cables are needed (i.e. power supply, remote control, USB, video). A flexible cable tidy is supplied for holding the cables together in order to improve the ergonomics of the setup.

To handle the cables together, simply pass them through the guide as illustrated in *Fig. 15*. The cables can be taken off from the guide at any time.

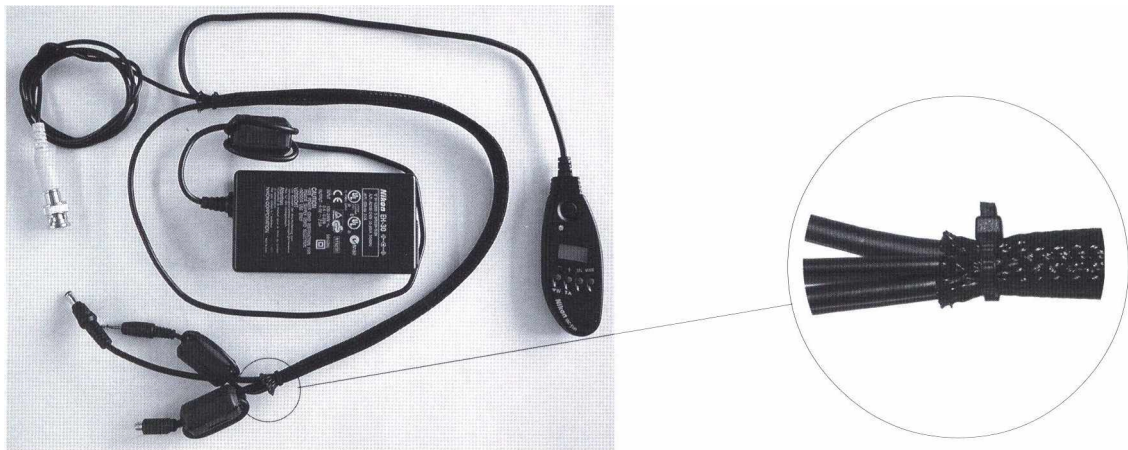


Fig. 15: Illustration of cable handling

Two adhesive Velcro® bands are furnished. One can be used to fix the EH-30 power supply box to the microscope table. The second one can be used to fix the remote control unit. *Fig. 16* illustrates a possible configuration.

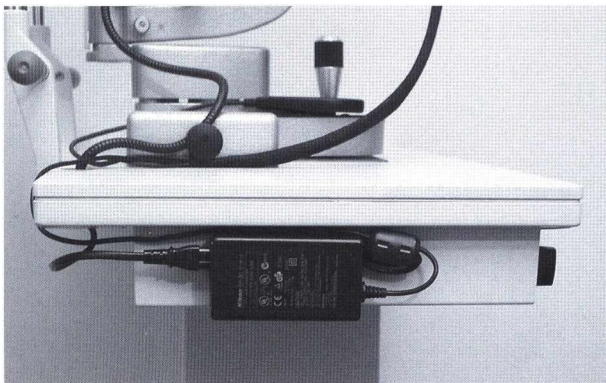


Fig. 16: Fixation of the power supply and remote control with the Velcro® bands

Appendix B. Equipment maintenance routines

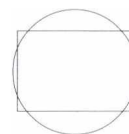
A duster should be used for dusting the exposed glass surfaces. Surfaces which have become really dirty should first be dusted, then wiped carefully with a soft dry clean cloth, washed linen, chamois leather, or some such material which will not scratch the surface.

Appendix C. Technical specifications

Object image section

Circle

object image section viewed
through the microscope ocular



Rectangle

area of photograph

Adapter magnification

2.5 x

Magnification changer setting	Magnification at the camera	Object image sections in mm H x V
6.3 x	0.23 x	30 x 22.5
10 x	0.36 x	20 x 15
16 x	0.57 x	13 x 9.75
25 x	0.91 x	8 x 6
40 x	1.43 x	5 x 3.75

Values given for the Coolpix® 990 with the maximum optical zoom position (f = 24 mm) and no digital zoom (X1.00).

Tube

Slit lamp mount compatibility

BQ beam splitter 900.7.10

Camera mount compatibility

Coolpix® 990,
Coolpix® 950

Diaphragms

progressive adjustable ø 3.6 - 18.2 mm

Index ring

1 - 4 (4 = smallest, 1 = largest)

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